

REMARKS

Applicants wish to thank the Examiner for the careful consideration given this application. Claims 1-7 are pending in this Application.

Rejections under 35 U.S.C. § 103

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,180,710 to Hergenrother et al. (hereinafter "Hergenrother") in view of Cruse. Applicants traverse this ground of rejection.

Hergenrother discloses the incorporation of inorganic salts into precipitated silica improving the filler dispersion in compounded rubber, including halobutyl rubber. *See Hergenrother, Abstract*. Hergenrother states that inorganic salts are not conventionally added to rubber compositions and that silica manufactures expend effort to reduce the inorganic salt content to less than 0.5 wt. %. *See Hergenrother, column 1, lines 50-65*. Moreover, Hergenrother adds that the addition of inorganic salts modifies the compounded rubber's properties by improving filler dispersion, improving processability and desirably decreasing the tan delta at 50°C, reduces the 50% strain modulus, and increasing the 300% strain modulus of cured vulcanizates. *See Hergenrother, column 2, lines 19-26*. Hergenrother states that the salt should be present in an amount from about 1 or 2 to about 35% by weight of the silica. *See Hergenrother, column 3, lines 26-27*. In contrast, instant claim 1 features a filled halobutyl elastomer composition having at least one halobutyl elastomer, at least one mineral filler and at least one protected thiol. The mineral filler featured in instant claim 1 is not the same filler as described in Hergenrother. As set forth in the instant Specification, examples of mineral fillers include highly dispersed silicas, prepared by the precipitation of silicate solutions or the flame hydrolysis of silicon halides. *See the instant Specification, page 6, lines 26-27*. The silica set forth in the instant Specification is a conventional silica as described in Hergenrother as having less than 0.5 wt. % inorganic salt. As such, the mineral filler of instant claim 1 is not the same as the inorganic salt-treated silica as set forth in Hergenrother.

Hergenrother further treats the salt-treated silane with a thiol compound but does not disclose treating the salt-treated silica with a blocked thiol compound. Cruse, on the other hand, discloses the use of sulfur silane coupling agents, including blocked mercaptosilanes, in the manufacture of rubbers compositions. Applicants respectfully submit that the combination of the sulfur silane coupling agents of Cruse combined with the salt-treated silica disclosed in Hergenrother does not arrive at the features of the instant claims. As noted, Hergenrother teaches modifying silica with inorganic salts at concentrations well in excess of the salt concentration found in commercial silica (Hergenrother, column 1, line 60-65) and preferably a silane or mercapto silane compound, whereas, Cruse discloses curing the non-butyl rubber with blocked mercaptosilanes. As such, the combination of Hergenrother with Cruse does not provide a *prima facie* obviousness.

At best, if one skilled in the art would combine the references to modify the concentration of inorganic salt in the silica according to Hergenrother with blocked mercaptosilanes of Cruse, one would produce a salt-treated silica and protected mercapto for use in butyl compositions. As noted, Cruse does not disclose the use of halobutyl. Further, the instant claims do not feature a salt-treated silica as disclosed in Hergenrother but rather instant claim 1 features conventional mineral fillers that Hergenrother specifically discourages since Hergenrother uses the salt to achieve unexpected properties. *See Hergenrother, Summary of the Invention*. Thus, one combining Hergenrother with Cruse would not find motivation to eliminate the salt-treatment of the silica.

Moreover, there is no expectation of success of curing halogenated butyl rubber with the blocked mercaptosilanes of Cruse according to the teachings of Hergenrother even if such a combination was possible without other modifications to the system, which is neither hinted to nor disclosed in the references. The teachings of Hergenrother utilize the hydrophilic end of the silane molecules in combination with inorganic salt while the teachings of Cruse utilize the hydrophobic end of the blocked mercaptosilane molecules.

There is no indication in the references that using the blocked mercaptosilanes of Cruse would be successful in curing rubber, especially halobutyl rubber, compositions by utilizing the blocked mercaptosilanes to modify the surface of salt-treated silica as set forth in Hergenrother. As such, one skilled in the art would neither be motivated to combine the references nor find a likelihood of success in combining the references to arrive at the features of instant claim 1.

The Applicants have shown in the previously filed response unexpected properties employing a blocked thiol modifier with a halobutyl rubber over that of non-halogenated rubber. Further, the Applicants add that Cruse is not even directed to butyl rubber. The described rubbers in Cruse do not include butyl rubber. *See Cruse, column 15, lines 17-54.* Butyl rubber is a rubber based on isobutylene and isoprene. This combination is not disclosed in Cruse. Hergenrother, on the other hand, does disclose butyl rubber and halobutyl rubber but does not disclose using a blocked thiol compound with these rubbers (it is further noted that a mercaptan (thiol) is not the same as a blocked thiol). Therefore, even if one were to combine the references, one still would not arrive at the features of the instant claims. The only motivation to use a blocked thiol compound with either a butyl or halobutyl rubber is found solely in the Applicant's own disclosure. Such a finding of motivation is impermissible. *See MPEP 2145.*


In view of the foregoing, one skilled in the art would not find the instant claims obvious even if the references were combined.

Applicants submit that the pending Claims are in condition for allowance and respectfully request notice to such effect. Should the Examiner have any questions regarding the current claimed invention, he is invited to initiate a telephone conference with the undersigned.

The USPTO is hereby authorized to charge any fees for an extension of time or those under 37 C.F.R. 1.16 or 1.17, which may be required by this paper, and/or to credit any overpayments to Deposit Account No. 50-2527.

Respectfully submitted,

By



Michael A. Miller
Attorney for Applicants
Reg. No. 50,732

LANXESS Corporation
Law & Intellectual Property Department
111 RIDC Park West Drive
Pittsburgh, Pennsylvania 15275-1112
(412) 809-2232
FACSIMILE PHONE NUMBER:
(412) 809-1054

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